Math 20E

August 11, 2015

Question 1 Consider the iterated integral

$$\int_{y=0}^{\sqrt{\pi/2}} \int_{x=y}^{\sqrt{\pi/2}} \sin\left(x^2\right) dx\, dy.$$

Which best describes how it might be evaluated?

A. The iterated integral can easily be integrated by evaluating it as written, integrating with respect to x first and then y.

B. The iterated integral is impossible to integrate analytically because the antiderivative of $\sin(x^2)$ cannot be expressed in terms of elementary functions.

C. The iterated integral should be expressed as

$$\iint_D \sin(x^2)\, dA$$

for an appropriate region D.

D. The iterated integral should be rewritten as an iterated integral with respect to y first and then x.

*__E.__ Both **C** and **D**: one should determine the region D in **C** in order to determine the appropriate limits of integration for the re-ordered iterated integral in **D**.

Question 2 Consider the triple integral

$$\int_{z=p}^{q} \int_{y=c}^{d} \int_{x=a}^{b} f(x, y, z)\, dx\, dy\, dz.$$

Which of the following best describes the possibility(s) for the order of integration?

A. There is only one possible order of integration: the one given.

B. There are two possible orders of integration: x and y may be switched, as in double integrals.

C. There are three possible orders of integration: one for each variable.

***D.** There are six possible orders of integration: one for each permutation of (x, y, z).

E. None of the above: not enough information is given about the region of integration to decide.

Question 3 The speed of an object is constant. The object's

*A. velocity and acceleration are perpendicular.

B. acceleration is zero.

C. velocity is constant.

D. both **B** and **C**.